U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-260 891

Audubon Lake
McLean County, North Dakota

National Eutrophication Survey, Corvallis, Oreg

Prepared for

Corvallis Environmental Research Lab, Oreg

Oct 76

343053

PB 260 891

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

☆G.P.O. 699-440

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Report on Audubon Lake, McLean County, North Dakota		5. REPORT DATE Prepared October 1976 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper # 566
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1974 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 25
	20. SECURITY CLASS *(This page)*	22. PRICE 3.50

EPA Form 2220-1 (9-73)

REPORT

ON

AUDUBON LAKE

MCLEAN COUNTY

NORTH DAKOTA

EPA REGION VIII

WORKING PAPER No. 566

WITH THE COOPERATION OF THE

NORTH DAKOTA STATE DEPARTMENT OF HEALTH

AND THE

NORTH DAKOTA NATIONAL GUARD

OCTOBER, 1976

CONTENTS

	Page
Foreword	ii
List of North Dakota Study Lakes and Reservoirs	iv
Lake and Drainage Area Map	v
Sections	
I. Introduction	1
II. Conclusions	1
III. Lake Characteristics	3
IV. Lake Water Quality Summary	4
V. Literature Reviewed	8
VI. Appendices	9

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the North Dakota State Department of Health for professional involvement, to the North Dakota National Guard for conducting the tributary sampling phase of the Survey, and to those North Dakota wastewater treatment plant operators who voluntarily provided effluent samples and flow data.

Norman L. Peterson, Director, and the staff of the Division of Water Supply and Pollution Control of the Department of Health, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

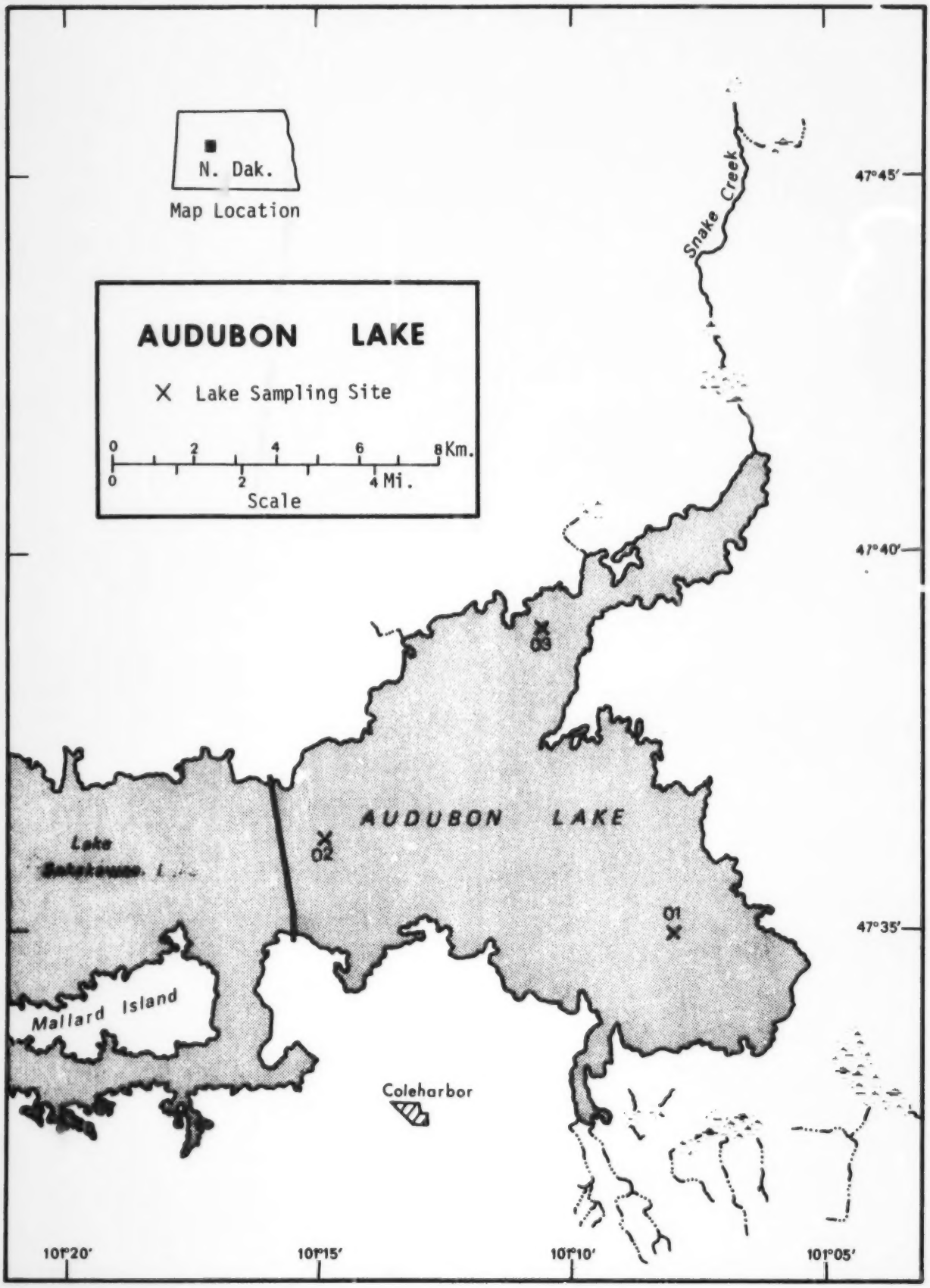
Major General LaClair A. Melhouse, the Adjutant General of North Dakota, and Project Officer Colonel Irvin M. Sande, who directed the volunteer efforts of the North Dakota National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES AND RESERVOIRS

STATE OF NORTH DAKOTA

NAME	COUNTY
Ashtabula	Barnes, Griggs
Audubon	McLean
Brush	McLean
Darling	Renville, Ward
Devils	Benson, Ramsey
Jamestown	Stutsman
LaMoure	LaMoure
Matejcek	Walsh
Metigoshe	Bottineau
Pelican	Bottineau
Sakakawea	Dunn, McKenzie, McLean, Mercer, Mountrail, Williams
Spiritwood	Stutsman
Sweet Briar	Morton
Whitman	Nelson, Walsh


N. Dak.
Map Location
AUDUBON LAKE
X Lake Sampling Site
0 2 4 6 8 Km.
0 2 4 Mi.
Scale
Snake Creek
47°45′
47°40′
47°35′
03
02
01
AUDUBON LAKE
Lake
Mallard Island
Coleharbor
101°20′
101°15′
101°10′
101°05′

AUDUBON LAKE

STORET NO. 3802

I. INTRODUCTION

Audubon Lake was included in the National Eutrophication Survey as a water body of interest to the North Dakota Department of Health. Tributaries and nutrient sources were not sampled, and this report relates only to the lake sampling data.

Audubon Lake is a controlled basin containing water pumped from Lake Sakakawea via the Bureau of Reclamation's Snake Creek Pumping Station. The lake has a relatively high recreational and fishing usage. A limited amount of agricultural runoff enters the lake (Peterson, 1974).

II. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Audubon Lake is eutrophic. It ranked sixth in overall trophic quality when the 14 North Dakota lakes sampled in 1974 were compared using a combination of six lake parameters*. Four lakes had less median total and dissolved phosphorus, seven had less median inorganic nitrogen, four had less mean chlorophyll a, and seven had greater mean Secchi disc transparency. Depression of dissolved oxygen with depth occurred at all stations in July.

The field limnologists noted algal blooms in the open water in September.

---

* See Appendix A.

B. Rate-Limiting Nutrient:

The algal assay results indicate that primary productivity in Audubon Lake was nitrogen limited at the time the sample was collected (04/26/73). The lake data indicate nitrogen limitation on all sampling dates.

III. LAKE CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 48.56 kilometers^2.
2. Mean depth: unknown.
3. Maximum depth: 15.2 meters.
4. Volume: unknown.

B. Precipitation*:

1. Year of sampling: 53.1 centimeters.
2. Mean annual: 47.0 centimeters.

---

† Table of metric equivalents--Appendix B.
†† Henegar, 1975.
* See Working Paper No. 175, "...Survey Methods, 1973-1976".

IV. LAKE WATER QUALITY SUMMARY

Audubon Lake was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from three stations on the lake and from a number of depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 4.6 meters at station 1, 9.8 meters at station 2, and 6.1 meters at station 3.

The sampling results are presented in full in Appendix C and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE AUDUBON
STORET CODE 3802

PARAMETER	1ST SAMPLING (4/26/74) 3 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/18/74) 3 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/13/74) 3 SITES RANGE	MEAN	MEDIAN
TEMP (C)	5.9 - 6.8	6.5	6.7	22.8 - 27.0	24.6	24.3	11.8 - 13.7	12.9	13.0
DISS OXY (MG/L)	12.0 - 15.6	13.3	12.8	4.0 - 9.0	6.3	5.8	8.4 - 9.8	9.1	8.9
CNDCTVY (MCROMO)	863. - 921.	895.	898.	1405. - 1587.	1483.	1475.	1199. - 1223.	1209.	1210.
PH (STAND UNITS)	8.6 - 8.9	8.7	8.6	8.8 - 9.3	9.1	9.0	8.2 - 8.6	8.4	8.4
TOT ALK (MG/L)	314. - 370.	341.	334.	340. - 455.	408.	408.	435. - 665.	550.	575.
TOT P (MG/L)	0.087 - 0.131	0.108	0.105	0.043 - 0.114	0.070	0.066	0.076 - 0.103	0.088	0.086
ORTHO P (MG/L)	0.006 - 0.023	0.012	0.013	0.007 - 0.073	0.025	0.023	0.008 - 0.045	0.026	0.022
NO2+NO3 (MG/L)	0.020 - 0.210	0.133	0.170	0.020 - 0.100	0.039	0.040	0.020 - 0.440	0.210	0.120
AMMONIA (MG/L)	0.030 - 0.040	0.035	0.030	0.070 - 0.340	0.172	0.180	0.050 - 0.130	0.087	0.080
KJEL N (MG/L)	1.300 - 1.900	1.573	1.500	1.600 - 2.200	1.800	1.700	1.300 - 2.600	1.970	1.900
INORG N (MG/L)	0.050 - 0.240	0.167	0.210	0.090 - 0.380	0.211	0.220	0.070 - 0.530	0.297	0.250
TOTAL N (MG/L)	1.420 - 1.970	1.705	1.680	1.640 - 2.220	1.839	1.750	1.710 - 2.620	2.180	2.130
CHLRPYL A (UG/L)	15.9 - 23.1	19.3	19.0	3.1 - 12.8	6.4	3.3	5.1 - 13.6	8.2	6.0
SECCHI (METERS)	1.0 - 1.2	1.1	1.2	1.5 - 4.0	2.4	1.5	0.6 - 0.6	0.6	0.6

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/26/74	1. Centric diatoms	2,039
	2. *Chlamydomonas sp.*	1,497
	3. *Chroomonas sp.*	542
	4. *Cryptomonas sp.*	181
	5. Chlorophytan colonies	129
	Other genera	179
	Total	4,567
07/18/74	1. *Aphanizomenon sp.*	579
	2. *Oscillatoria sp.*	83
	Total	661
09/13/74	1. *Aphanizomenon sp.*	5,350
	2. *Chroomonas sp.*	132
	Total	5,482

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (μg/l)
04/26/74	1	23.1
	2	19.0
	3	15.9
07/18/74	1	12.8
	2	3.1
	3	3.3
09/13/74	1	6.0
	2	5.1
	3	13.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.040	0.312	5.9
0.050 P	0.090	0.312	5.7
0.050 P + 1.0 N	0.090	1.312	19.3
1.0 N	0.040	1.312	12.0

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Audubon Lake was moderately high when the assay sample was collected (04/26/74). The results also indicate limitation by nitrogen. There was an increase in yield with the addition of only nitrogen, but the addition of orthophosphorus alone resulted in a yield not significantly different from that of the control.

The lake data indicate nitrogen limitation on all sampling dates; i.e., the mean inorganic nitrogen to orthophosphorus ratios were 13 to 1, 8 to 1, and 11 to 1, respectively.

V. LITERATURE REVIEWED

Henegar, Dale, 1975. Personal communication (lake morphometry). ND Game & Fish Dept., Bismarck.

Peterson, Norman L., 1974. Personal communication (general lake information). ND Dept. of Health, Bismarck.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
3801	LAKE ASHTABULA	0.260	0.160	472.250	40.892	10.600	0.170
3802	LAKE AUDUBON	0.087	0.220	446.222	11.322	11.000	0.015
3803	BRUSH LAKE	0.066	0.095	449.143	29.114	9.000	0.010
3804	LAKE DARLING	0.274	0.250	466.750	60.075	11.600	0.180
3805	DEVILS LAKE	0.630	0.140	449.333	38.508	14.600	0.469
3806	JAMESTOWN RESERVOIR	0.144	0.365	438.667	19.400	8.800	0.078
3807	LAKE LA MOURE	0.438	0.380	421.400	19.720	15.000	0.290
3808	MATEJCEK LAKE	0.228	0.440	475.167	2.683	14.400	0.179
3809	LAKE METIGOSHE	0.032	0.080	389.167	10.367	9.000	0.010
3811	PELICAN LAKE	0.034	0.070	364.500	10.950	12.800	0.006
3812	LAKE SAKAKAWEA (GARRISON	0.016	0.150	408.733	6.883	10.800	0.007
3813	SPIRIT WOOD LAKE	0.156	0.290	417.833	34.667	15.000	0.082
3814	SWEET BRIAR RESERVOIR	0.092	0.090	440.800	39.000	8.800	0.031
3815	WHITMAN LAKE	0.260	0.260	478.333	27.067	9.200	0.185

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
3801	LAKE ASHTABULA	27 (3)	54 (7)	15 (2)	8 (1)	62 (8)	38 (5)	204
3802	LAKE AUDUBON	69 (9)	46 (6)	46 (6)	69 (9)	46 (6)	69 (9)	345
3803	BRUSH LAKE	77 (10)	77 (10)	38 (5)	38 (5)	81 (10)	81 (10)	392
3804	LAKE DARLING	15 (2)	38 (5)	23 (3)	0 (0)	38 (5)	23 (3)	137
3805	DEVILS LAKE	0 (0)	69 (9)	31 (4)	23 (3)	15 (2)	0 (0)	138
3806	JAMESTOWN RESERVOIR	54 (7)	15 (2)	62 (8)	62 (8)	96 (12)	54 (7)	343
3807	LAKE LA MOURE	8 (1)	8 (1)	69 (9)	54 (7)	4 (0)	8 (1)	151
3808	MATEJCEK LAKE	38 (5)	0 (0)	8 (1)	100 (13)	23 (3)	31 (4)	200
3809	LAKE METIGOSHE	92 (12)	92 (12)	92 (12)	85 (11)	81 (10)	81 (10)	523
3811	PELICAN LAKE	85 (11)	100 (13)	100 (13)	77 (10)	31 (4)	100 (13)	493
3812	LAKE SAKAKAWEA (GARRISON	100 (13)	62 (8)	85 (11)	92 (12)	54 (7)	92 (12)	485
3813	SPIRIT WOOD LAKE	46 (6)	23 (3)	77 (10)	31 (4)	4 (0)	46 (6)	227
3814	SWEET BRIAR RESERVOIR	62 (8)	85 (11)	54 (7)	15 (2)	96 (12)	62 (8)	374
3815	WHITMAN LAKE	27 (3)	31 (4)	0 (0)	46 (6)	69 (9)	15 (2)	188

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	3809	LAKE METIGOSHE	523
2	3811	PELICAN LAKE	443
3	3812	LAKE SAKAKAWEA (GARRISON	485
4	3803	BRUSH LAKE	392
5	3814	SWEET BRIAR RESERVOIR	374
6	3802	LAKE AUDUBON	345
7	3806	JAMESTOWN RESERVOIR	343
8	3813	SPIRIT WOOD LAKE	227
9	3801	LAKE ASHTABULA	204
10	3808	MATEJCEK LAKE	200
11	3815	WHITMAN LAKE	188
12	3807	LAKE LA MOURE	151
13	3805	DEVILS LAKE	138
14	3804	LAKE DARLING	137

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/02/13

380201
47 35 00.0 101 08 00.0 4
LAKE AUDUBON
38 NORTH DAKOTA

11EPALES 2111202
0019 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/26	13 10	0000	5.9		47	902	8.90	332	0.040	1.600	0.070	0.023
	13 10	0005	5.9	15.6		883	8.90	332	0.030	1.900	0.040	0.015
	13 10	0015	5.9	15.6		898	8.90	334	0.030	1.700	0.050	0.016
74/07/18	20 50	0000	27.0	5.8	60	1587	9.30	455	0.070	2.100	0.020	0.013
	20 50	0005	25.3	6.6		1555	9.20	400	0.080	2.200	0.020	0.018
	20 50	0010	24.3	5.6		1531	9.20	385	0.120	2.000	0.030	0.024
	20 50	0015	24.0	5.4		1533	9.20		0.220	1.900	0.020	0.040
74/09/13	14 35	0000	12.0	9.8	24	1223	8.65	630	0.060	2.600	0.020	0.008
	14 35	0005	11.9	9.8		1219	8.65	600	0.050	2.500	0.020K	0.012
	14 35	0014	11.8	9.8		1212	8.65	665	0.050	2.500	0.020K	0.012

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/26	13 10	0000	0.130	23.1	
	13 10	0005	0.131		
	13 10	0015	0.129		
74/07/18	20 50	0000	0.059	12.8	
	20 50	0005	0.074		
	20 50	0010	0.079		
	20 50	0015	0.086		
74/09/13	14 35	0000	0.102	6.0	
	14 35	0004			1.0
	14 35	0005	0.091		
	14 35	0014	0.103		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/13

380202
47 36 15.0 101 14 56.0 4
LAKE AUDUBON
38 NORTH DAKOTA

11EPALES 2111202
0035 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/26	13 25	0000	6.8		47	878	8.60	314	0.030	1.600	0.190	0.013
	13 25	0005	6.7	12.0		878	8.60	346	0.030	1.500	0.190	0.010
	13 25	0015	6.7	12.4		871	8.60	318	0.030	1.400	0.020	0.015
	13 25	0030	6.6	13.0		863	8.70	348	0.030	1.300	0.210	0.014
74/07/18	20 05	0000	26.6	7.2	159	1511	9.00	345	0.160	1.700	0.050	0.007
	20 05	0005	25.1	7.2		1467	8.90	340	0.180	1.700	0.040	0.014
	20 05	0010	24.0	6.0		1439	8.95	415	0.180	1.700	0.100	0.014
	20 05	0020	23.5	5.6		1423	9.00	415	0.210	1.700	0.040	0.023
	20 05	0031	22.8	4.0		1405	8.80	450	0.340	1.800	0.040	0.073
74/09/13	15 20	0000	13.7	9.0	24	1210	8.30	585	0.090	1.800	0.440	0.045
	15 20	0005	13.7	8.6		1211	8.29	495	0.080	1.500	0.420	0.043
	15 20	0015	13.7	8.4		1210	8.32	565	0.080	1.500	0.420	0.044
	15 20	0032	13.6	8.6		1206	8.23	440	0.080	1.300	0.410	0.041

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/26	13 25	0000	0.109	19.0	
	13 25	0005	0.105		
	13 25	0015	0.103		
	13 25	0030	0.110		
74/07/18	20 05	0000	0.043	3.1	
	20 05	0005	0.052		
	20 05	0010	0.055		
	20 05	0020	0.066		
	20 05	0031	0.114		
74/09/13	15 20	0000	0.088	5.1	
	15 20	0005	0.093		
	15 20	0007			1.0
	15 20	0015	0.085		
	15 20	0032	0.083		

STORET RETRIEVAL DATE 75/02/13

380203
47 39 00.0 101 10 40.0 4
LAKE AUDUBON
38 NORTH DAKOTA

11EPALES 2111202
0025 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/26	13 55	0000	6.8		39	921	8.65	370	0.040	1.800	0.170	0.007
	13 55	0005	6.8	12.6		919	8.65	366	0.040	1.500	0.170	0.007
	13 55	0015	6.8	13.0		918	8.65	328	0.040	1.500	0.170	0.006
	13 55	0020	6.8	12.6		918	8.65	358	0.040	1.500	0.180	0.009
74/07/18	20 30	0000	25.2	8.4	60	1483	9.25	455	0.090	1.700	0.030	0.013
	20 30	0005	24.9	9.0		1475	9.15	395	0.120	1.600	0.040	0.024
	20 30	0010	23.6	5.4		1441	9.00	400	0.180	1.600	0.040	0.027
	20 30	0016	23.4	5.2		1425	9.05	435	0.280	1.700	0.040	0.035
74/09/13	15 00	0000	13.0	8.8	24	1200	8.42	610	0.120	2.200	0.110	0.015
	15 00	0005	13.0	8.8		1200	8.40	475	0.130	1.900	0.120	0.022
	15 00	0015	13.0	9.0		1199	8.44	435	0.130	1.900	0.120	0.022

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/26	13 55	0000	0.093	15.9	
	13 55	0005	0.089		
	13 55	0015	0.087		
	13 55	0020	0.098		
74/07/18	20 30	0000	0.045	3.3	
	20 30	0005	0.105		
	20 30	0010	0.066		
	20 30	0016	0.072		
74/09/13	15 00	0000	0.076	13.6	
	15 00	0005	0.078		1.0
	15 00	0015	0.085		